

UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF TEXAS  
MARSHALL DIVISION

TIERRA INTELECTUAL BORINQUEN, INC.	)
	)
Plaintiff	)
	)
v.	)
	)
HTC CORPORATION et al.,	)
	)
Defendants.	)
	)
	)
TIERRA INTELECTUAL BORINQUEN, INC.	)
	)
	)
Plaintiff,	)
	)
v.	)
	)
TOSHIBA CORPORATION, et. al.,	)
	)
Defendants.	)
	)
	)

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**DECLARATION OF SANDEEP CHATTERJEE, Ph.D. IN SUPPORT OF TOSHIBA'S PROPOSED CONSTRUCTION OF "MEASUREABLE VARIABLE INPUT"**

1. I, Sandeep Chatterjee, Ph.D., have been asked by Defendants Toshiba Corporation and Toshiba America Information Systems, Inc. (collectively, "Toshiba"), by and through its counsel, Dickstein Shapiro LLP, to provide my expert opinion concerning the construction of a certain claim term in U.S. Patent Nos. 7,350,078 ("078 patent"), 7,725,725 ("725 patent") and 8,429,415 ("415 patent") (collectively, "the Asserted Patents").

**I. QUALIFICATIONS**

2. I earned a B.S. in electrical engineering and computer science from the University of California, Berkeley, a M.S. in computer science from the Massachusetts Institute of Technology, and a Ph.D. in computer science from the Massachusetts Institute of Technology. I have also completed the Executive Education Program on Global Business Leadership from Harvard University.

3. I have extensive experience in architecting, developing, optimizing, deploying and managing complex computing systems throughout the world, and technical expertise in developing enterprise-class applications using Java 2 Enterprise Edition (J2EE), eXtensible Markup Language (XML), Simple Object Access Protocol (SOAP) Web services, and mobile technologies, including the Android operating system. I have developed distributed computing and mobile hardware components and systems, including interfacing devices with computer processors. I have architected and helped develop systems that include cameras and touchscreens. I have invented, architected, and led the development (product, QA, documentation) as well as the initial sales & marketing efforts for key eBusiness, mobile, Web services, and J2EE middleware products and solutions at SouceTrace Systems, Cyndeo, Satora Networks, Bluestone Software, and Hewlett-Packard.

4. I was named a Young Global Leader for 2011 by the World Economic Forum for my professional accomplishments, commitment to society and potential to contribute to shaping the future of the world.

5. My doctoral dissertation at the Massachusetts Institute of Technology (MIT) was selected as one of the most important inventions in computing, and the invention is preserved and showcased in a time-capsule at the Museum of Science in Boston, Massachusetts. Other

recipients of this honor included Bill Gates, the founder of Microsoft, and Tim Berners-Lee, the inventor of the World Wide Web.

6. I am the author of a book on developing enterprise computing systems which has been adopted by over 100 universities worldwide and also by several corporations. I was also part of the Expert Group that defined the worldwide industry standard for Java 2 Mobile Edition (J2ME) Web Services.

7. I have attached a more detailed list of my qualifications as Exhibit A. Based on my academic and professional experiences, I believe that I am qualified in the technology fields pertaining to this case, as at least a person of ordinary skill in the art.

## **II. BASIS OF OPINIONS FORMED**

### **A. Level of Skill in the Art**

8. I understand that the following factors may be considered in establishing the level of ordinary skill in the art relevant to the Asserted Patents: type of problems encountered in art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.

9. To determine the level of skill that would be “ordinary” in this art, I believe that a person of ordinary skill must generally have the capability of understanding the general computer systems principles that are applicable to the pertinent art. In the patents-in-suit in this matter, the specific computer systems principles involve computer systems and authentication methods (i.e., methods of logging into computer systems).

10. I believe that “a person of ordinary skill in the art” regarding the Asserted Patents would be a person with a Bachelor of Science Degree in Electrical/Computer Engineering or Computer Science (or related subjects), plus 5-10 years of related professional experience, or a

person with both Bachelor and Master Degrees in Electrical/Computer Engineering or Computer Science (or related subjects) and 3-5 years of related experience. Sufficient relevant professional or practical experience may substitute for academic experience.

11. During the time period in which the purported inventions of the Asserted Patents were made (on or around April 2001), I believe I met this definition of a person of ordinary skill in the art.

**B. Claim Interpretation**

12. I understand that an infringement analysis begins by comparing the properly construed claims with the allegedly infringing devices or methods/processes. I further understand that claims are interpreted from the perspective of one of ordinary skill in the art at the time of the invention, and that the claims of a patent are construed consistent with the intrinsic evidence, which includes the language of the claim itself, the specification of the patent, other claims of the patent, and the relevant prosecution history from the U.S. Patent and Trademark Office. Other evidence not in the written record of the patent, i.e., extrinsic evidence, may also be considered if it is not clearly at odds with the intrinsic evidence. I have considered and applied these principles in forming the opinions below.

**III. MEANING OF CLAIM TERMS**

13. I have been asked to provide my opinions on the meaning of one certain term used in the Asserted Patents from the perspective of one of ordinary skill in the art as of the effective filing date of the Asserted Patents. My opinions are set forth below.

**A. “measurable variable input”**

14. Counsel for Toshiba has asked me to opine on a proper construction for “measureable variable input.” Following the principles outlined above, and based on my

education, experience, and review of the intrinsic record and the extrinsic evidence cited below, it is my opinion that a proper construction of “measureable variable input” is: “a variable quantity that can be measured, in contrast to a discrete quantity or condition that can be identified exactly,” or its equivalent. I explain the reasons for this opinion below.

15. It is my opinion that the phrase “measurable variable input” does not carry a specific, well-understood meaning that would have been appreciated by one of ordinary skill in the art, as of the effective filing dates of the Asserted Patents.

16. The specification of the Asserted Patents does not define the phrase “measurable variable input.” Indeed, there is not any use of the phrase “measurable variable input” (or variants thereof) *anywhere* within the detailed description or figures of the Asserted Patents. The words “measure” and “measured” only appear in the ‘078 patent, in the Background section, which describes a prior art reference (‘078 patent, 1:21-28, (emphasis added)):

U.S. Pat. No. 6,442,692 [Zilberman] disclosed a special microcontroller embedded within a keyboard. The microcontroller was employed “to **measure** certain characteristics of the user’s keystroke dynamics” independent of the typed text, including the timing, intervals, and durations of key presses and pauses. These **measured** characteristics were then used as integral information for authenticating a user’s identity. Thus, the specifications of the Asserted Patents do not provide any explanation or any details whatsoever regarding *what* a measurable variable input is (or *what* it is not). The only discussion of measurement, quoted above, distinguishes “measured characteristics,” such as “timing, intervals, and durations of key presses and pauses,” as “independent of” typed text.

17. However, the individual words “measurable,” “variable” and “input” (or variants thereof) have well-understood meanings within the field. Based on my education and

experience, it is my opinion that one of ordinary skill in the art at the time of the filing of the Asserted Patents and within the context of the Asserted Patents would understand the meaning of these individual words as:

- a. “Measureable” means a “quantity that can be measured,” *e.g.*, the voltage of an electrical signal within a computer;
- b. “Variable” means “able or apt to vary;”<sup>1</sup>
- c. “Input” means “information that is delivered to a computer.”<sup>2</sup>

18. My understanding of these terms is confirmed by dictionary definitions for these words. Dictionaries define the words (or variants thereof) within the phrase “measureable variable input” as follows:

- a. “Variable” means “able or apt to vary; subject to variation or changes; characterized by variations.” *See, e.g.*, Ex. B, Merriam Webster’s Collegiate Dictionary (10th Ed. 1999) (DEFTIB00000992-93; DEFTIB00001002).
- b. “Vary” means “to make a partial change in: make different in some attribute or characteristic.” *See, e.g.*, Ex. B, Merriam Webster’s Collegiate Dictionary (10th Ed. 1999) (DEFTIB00000992-93; DEFTIB00001003).
- c. “Measure” means “the dimensions, capacity, or amount of something ascertained by measuring;” “an estimate of what is to be expected (as of a person or situation);” “a measured quantity.” *See, e.g.*, Ex. B, Merriam Webster’s Collegiate Dictionary (10th Ed. 1999) (DEFTIB00000992-93; DEFTIB00000998).

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<sup>1</sup> It is my understanding that the word “variable” within the phrase “measureable variable input” is used as an adjective, and not as a noun.

<sup>2</sup> It is my understanding that the word “input” within the phrase “measureable variable input” is used as a noun, and not as a verb.

d. “Input” means “the information that is delivered to a data-processing device from the external world, the process of delivering this data, or the equipment that performs this process.” *See, e.g.*, Ex. C, McGraw-Hill Dictionary of Scientific and Technical Terms (4th Ed. 1989) (DEFTIB00000981-85; DEFTIB00000987).

19. It is important to consider the context of the technology discussed in the Asserted Patents. The Asserted Patents are generally about computer systems and authentication methods (i.e., methods of logging into computer systems). For example, the summary section of each of the Asserted Patents states (*see, e.g.*, ‘415 patent, 1:50-55):

Computer login may comprise any user-determined submission, including a plurality of transmissions for which submission may be passively terminated. Preferably a user determines the input devices and signal types as well as the content of signals. This makes submission theft more difficult and less likely.

Therefore, a proper construction of the term “measureable variable input” must be within the context of computer systems.

20. The Random House Kernerman Webster’s College Dictionary states that an “analog computer” means “a computer that represents data by measurable quantities, as voltages, **rather than by numbers**. Compare *digital computer*.” Ex. D, Random House Kernerman Webster’s College Dictionary, 2010 K Dictionaries Ltd., Copyright 2005, 1997, 1991 (DEFTIB00001593-94) (emphasis added); *see also* Ex. E, Merriam-Webster.com, Merriam-Webster, *last visited* Feb. 7, 2014 (“Analog” means “of or relating to a device or process in which data is represented by physical quantities that change continuously.”) (DEFTIB00001590-92). The Merriam Webster’s Collegiate Dictionary states that an “analog computer” means “a computer that operates with numbers represented by directly measurable quantities (as voltages or rotations)[.]” *See* Ex. F, Merriam Webster’s Collegiate Dictionary (10th ed. 1994) at 41

(DEFTIB00001581-83). Similarly, the Merriam Webster's Collegiate Dictionary states that "analog" means "of, relating to, or being a mechanism in which data is represented by continuously variable physical quantities 2b: of or relating to an analog computer . . ." *See Ex. F*, Merriam Webster's Collegiate Dictionary (10th ed. 1994) at 41 (DEFTIB00001581-83). Websters II New College Dictionary states that "analog" is "[o]f, relating to, or being a device in which data are represented by variable measurable physical quantities." *See Ex. G*, Websters II New College Dictionary (1999) at 40 (DEFTIB00001587-89).

21. The Microsoft Computer Dictionary states that "analog" means "[p]ertaining to or being a device or signal that is continuously varying in strength or quantity, such as voltage or audio, **rather than based on discrete units, such as the binary digits 1 and 0**. A lighting dimmer switch is an analog device because it is not based on absolute settings." *See Ex. H*, Microsoft Computer Dictionary (5th ed. 2002) at 26 (emphasis added) (DEFTIB00001584-86). The Microsoft Computer Dictionary also states that an "analog computer" means "a computer that measures data varying continuously in value, such as speed or temperature." *See Ex. H*, Microsoft Computer Dictionary (5th ed. 2002) at 26 (DEFTIB00001584-86).

22. Essentially, the dictionary definitions (both general purpose and computer-related) make clear that measureable quantities, such as voltages or rotations, are different from discrete quantities, such as numbers or discrete units. This is consistent with the understanding of one of ordinary skill in the art because if a quantity were discrete, then it would not need to be measured; it could simply be identified. Therefore, it is my opinion that the word "measureable" in the term "measureable variable input" is significant, and distinguishes it from other types of input, i.e. discrete inputs.

23. This understanding of the distinction between discrete and measureable is also confirmed by the patents' specifications. Figure 10 of the Asserted Patents shows the selectable signals as being of a measurable and variable variety (*e.g.*, location, speed, vector and shape), and as distinct from text input which (while present) is not one of the selectable signal types. Indeed, the patents identify passwords, pass-phrases and words of text as prior art, stating (*see, e.g.*, '725 Patent, 4:4-8, 15-18):

Historically, a single signal 2 of a single transmission 1 has typically been used for a signature 4, namely a password, which is a signature 4 of a single word of text. A pass-phrase is a signature 4 of a plurality of words of text.

....

Historically, validation 18 has required an absolute signal match 5 to input 22: for example, no deviance from a character-based password has been permitted.

The specification consistently links the need for "absolute signal match" to non-variable, discrete inputs such as character-based passwords. *See, e.g.*, '078 Patent, 4:10-11. A person of ordinary skill in the art would readily appreciate this connection because no variability is expected or allowed for discrete passwords. Moreover, a discrete character-based password is readily identifiable by a computer and would not require "measurement" to identify the characters. Additionally, as I discussed earlier, the only mention of the word "measurement" (or variants thereof) in the specifications of the Asserted Patents distinguishes "measured characteristics," such as "timing, intervals, and durations of key presses and pauses," as "independent of" typed text. *See* '078 Patent, 1:22-28.

24. Finally, this construction of "measureable variable input" is not inconsistent with Plaintiff's proposed construction: "[a] quantity, property, or condition that is measurable from an 'input device,'" but provides important clarifications. Plaintiff's proposed construction includes

the word “measureable,” but does not clarify, within the proposed construction, important connotations of a “quantity, property, or condition” being “measureable” or “variable.” As I described above, both the intrinsic evidence (*see, e.g.*, ‘078 Patent, 1:21-28) and the extrinsic evidence (*e.g.*, the dictionary references provided above) are consistent in differentiating “measureable” quantities (*e.g.*, “timing, intervals, and durations”) from discrete quantities (*e.g.*, keyed-in text).

25. Based at least on the reasoning set forth above, it is my opinion that a proper construction of “measureable variable input” is: “a variable quantity that can be measured, in contrast to a discrete quantity or condition that can be identified exactly,” or its equivalent. Otherwise, this term is insolubly ambiguous.

I declare under penalty of perjury that the foregoing is true and correct. Executed on April 8, 2014.



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Sandeep Chatterjee, Ph.D.